

CLAIMS

1. Cage drying-compacting apparatus for wastes, comprising a cylindrical body and at least a pair of pressure plates, said cylindrical body being comprised of heating longitudinal tubes, coursed by a thermal carrier fluid, provided along the generatrixes of the cylinder and spaced each other, in such a way to realise longitudinal slots for outlet of vapour but not for outlet of material, coupled by constraint hinge means, positioned at a given distance between centres, and said pressure plates being placed opposed to each other, operating as movable basis of said cylindrical body and acting as pressing pistons, steam generated by the heating step of said wastes being discharged through the longitudinal slots between said heating tubes, characterised in that it provides further heat sources, provided inside the cage drying-compacting apparatus, all along its length, said sources being comprised of at least one tube which the thermal carrier fluid runs through, means for inlet of the material to be subjected to treatment, in a position close to one of the two ends of the apparatus, and means for collecting the material subjected to the treatment, in correspondence of the opposed end.
2. Drying - compacting apparatus according to claim 1, characterised in that said further heat sources comprise a plurality of tubes coursed by thermal carrier fluid and placed aligned, spaced each other, in such a way to divide the inner volume of the cylindrical body into sections connected each other, for each section being provided a pair of opposed pressure plates, shaped on the basis of the shape of each section.
3. Drying-compacting apparatus according each one of claims 1 or 2, characterised in that further heat sources comprise a plurality of tubes coursed by thermal carrier fluid and placed aligned, spaced each other, to allow the passage of the material to be subjected to treatment, in such a way to divide the inner volume of the cylindrical body into four equivalent sections connected each other, each section being provided with a pair of opposed pressure plates, shaped on the basis of the shape of each section.
4. Drying - compacting apparatus according each one of the preceding claims, characterised in that said pressure plates are shaped in such a way that the profile faced toward the outer surface of the cage has a straddle profile, in such a way that cusps defined between a straddle

and the adjacent one are insinuate within the space between two adjacent tubes.

5 5. Drying – compacting apparatus according each one of the preceding claims, characterised in that said pressure plates are shaped in such a way that the profile faced toward the outer surface of the cage has a straddle profile, in such a way that cusps defined between a straddle and the adjacent one are insinuate within the space between two adjacent tubes.

10 6. Drying – compacting apparatus according each one of the preceding claims, characterised in that said further heat sources are constrained by a containment structure, comprised of a plurality of constraint plates, provided at a set distance between centres.

15 7. Drying – compacting apparatus according each one of the preceding claims, characterised in that it provides inlet and outlet manifolds for said thermal carrier fluid from the tubes, coupled by flexible joints, in such a way to allow a uniform distribution of the fluid within the tubes.

20 8. Drying – compacting apparatus according to claim 7, characterised in that said inlet and outlet manifolds for said thermal carrier fluid are provided in such a way that the flow direction within each single tube is opposed to the one of the adjacent tube.

25 9. Drying – compacting apparatus according each one of the preceding claims, characterised in that said means for inlet of the material to be subjected to treatment comprise a loading hopper, from which refuses fall within a loading chamber at the inlet end of the cylindrical body.

30 10. Drying – compacting apparatus according each one of the preceding claims, characterised in that it further comprises a thermo-insulating material case, tightly containing said cylindrical body, having a manifold function for the vapour exiting from said longitudinal slots and put in a depression mode by a closed cycle motor-condensing unit in such a way that said apparatus has no impact on the working environment and on the outer environment.

35 11. Drying – compacting apparatus according each one of the preceding claims, characterised in that said constraint rims are mounted on a series of resting and sliding means creating a labile statically indeterminable structure in order to minimise the effects due to stresses

deriving from the high thermal gradients, as well from the radial thrusts due to the compression forces exerted by the opposed pressure plates.

12. Process of compacting and drying wastes by a drying – compacting apparatus as defined in each one of the preceding claims 1 - 11, characterised in that, a set running, includes the following steps, that are cyclically repeated:

- withdrawing the pressure plates of both sides of the apparatus up to the respective lower death ends;

- introducing within the drying – compacting apparatus, at the operative temperature, already containing an amount of refuses introduced during the previous cycles, a set loading amount of material to be subjected to treatment,

- operating the pressure plates of the material inlet side, in such a way that they press the introduced material with the new charge against the material already present within the cylindrical body of the drying – compacting apparatus, thrusting it in such a way that a fraction of the material, at the end opposite with respect to the inlet one of the material is made exiting,

- withdrawing the pressure plates from the side of inlet of the material up to the lower death end,

- taking the amount of material exited from the apparatus,

- operating the pressure plates of both the apparatus sides, in such a way that they will press the material therein,

- repeating the cycle of the first step.

13. Process of compacting and drying wastes according to claim 11, characterised in that set running operation conditions are reached by the following steps, starting from an empty apparatus:

- making the thermal carrier fluid flowing within the tubes, to reach the operative temperatures,

- withdrawing the pressure plates of both sides of the apparatus up to the relevant lower death points,

- introducing a batch of the waste to be subjected to the treatment within the drying – compacting apparatus, that is at the operative temperature,

- operating the pressure plates of both the sides of the apparatus, in such a way that they press and move the material contained therein,

said steps being cyclically repeated until reaching the set filling grade.